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Notice of Allowability	Application No.	Applicant(s)	
	10/661,180	QIN ET AL.	
	Examiner	Art Unit	
	Boris Benenson	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09/12/2003.
2. ☒ The allowed claim(s) is/are 1-27.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>9/12/3 1/25/5 10/20/05</u> 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____ |
|---|--|

Detailed Actions

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Replace sentence "This application is related to U.S. application Ser. No. _____, filed on Sep. 8, 2003 (Attorney Docket No. 03-IMP-001)" on Page 1, lines 8-9 of the Specification with -- This application is related to U.S. application Ser. No. 10/657,449, filed on Sep. 8, 2003 (Now US Patent 6,947,274)--.

Authorization for this examiner's amendment was given in a telephone interview with attorney of the case Thomas G. Eschweiler on 02/02/2006.

Allowable Subject Matter

2. Claims 1-27 are allowed.

The following is an examiner's statement of reasons for allowance:

3. Independent Claim 1 is allowable because none of the prior art of record disclose a method for clamping a wafer having a

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backside insulator wherein the determination a single phase square wave clamping voltage is based, at least in part, on a minimum residual clamping force associated with the wafer and the electrostatic chuck and a surface topography of the leaky dielectric layer in combination with the other claim limitations.

4. Independent Claim 17 is allowable because none of the prior art of record disclose a system for clamping a wafer having a backside insulator, wherein the J-R electrostatic chuck is operable to maintain a minimum residual clamping force during a polarity switch of the single-phase square wave clamping voltage in combination with the other claim limitations.

5. Claims 2-16 and 18-27 are dependent on allowable claims and therefore allowable.

Related Prior Art

6. Use of Johnsen-Rahbek effect in systems for clamping a semiconductor wafer having backside insulator is well known in the art. A known problem to be solved is a relatively long time required for dissipation electrostatic charges accumulated during processing (dechucking).

Kumar et al. (5,880,924) disclose an Electrostatic Chuck Capable Of Rapidly Dechucking A Substrate wherein "The chuck further comprises a discharge electrode electrically isolated

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from the charging electrode for rapidly discharging any residual electrostatic charge accumulated in the chuck during processing" (Col.3, Lines 16-19).

Leeser (6,236,555) disclosed a Method For Rapidly Dechucking A Semiconductor Wafer From An Electrostatic Chuck Utilizing A Hysteretic Discharge Cycle. Leeser disclosed, "This charge migration effect is known as the Johnsen-Rahbek effect. The Johnsen-Rahbek effect in a monopolar chuck provides a very effective and strong electrostatic force that retains the wafer. However, charge removal is also very difficult for such a chuck. To rapidly dechuck the wafer from the monopolar chuck, the invention applies a voltage between the wafer and the electrode that performs a hysteretic discharge cycle such that residual charge is removed, i.e., a hysteretic electric field is established at the interface between the wafer support surface of the chuck and the wafer" (Col.3, Lines 15-25).

All Prior Art of the record indicate difficulties in process of "dechucking" and provide rather complicated ways to dissipate electrostatic charges accumulated in the chuck during wafer processing. None of Prior Art of the record teaches a method or a system for clamping a wafer having a backside insulator, which prevents accumulation of excessive electrostatic charges instead of dissipation of the charges.

Comments to reasons for allowance

7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Boris Benenson whose telephone number is (571) 272-2048. The examiner can normally be reached on M-F (8:20-6:00) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272-2800 ext 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval

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(PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Boris Benenson
Examiner
Art Unit 2836

B.B.



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SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000